

RISK MANAGEMENT SURVEY: ANALYSIS OF RESPONSES AND RECOMMENDATIONS

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Risk Management Survey: Analysis of Responses and Recommendations
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EXECUTIVE SUMMARY

This survey has been designed and executed to support the Department of Energy's (DOE's) ongoing efforts to maintain a high level of management expertise in program and project management for the acquisition of capital assets. The survey is intended to provide guidance to DOE's Office of Environmental Management (EM) for their efforts to assure that all elements of risk associated with their projects have received appropriate consideration throughout the life cycle of an EM project.

The survey was developed to determine the current levels of project risk management and contingency determination, and to solicit comments related to improving the process of risk management for EM projects. The results of the survey, and subsequent analysis provides:

- Technical comparisons of the approaches at various sites to manage risk,
- The degree of implementation of risk management at the sites,
- The degree of success for implementation of risk management at the sites,
- The areas of potential improvement of risk management at the sites, and
- Specific recommendations for EM to implement a process to strengthen the management of project risk at all EM sites.

Fourteen DOE EM sites participated in the survey.

Survey Results

Survey results indicate that only half of the responding sites have approved project risk policies and procedures in place. A similar number have contingency analysis procedures in place.

The survey also indicates that the majority (but not overwhelming in terms of number) of respondents appear to use appropriate project risk management methodologies and approaches. However, the respondents cited various risk management and contingency guidance sources (DOE, site policy, other).

Half of the responding sites do not conduct or offer any project risk management training.

While most sites claimed to use both deterministic and probabilistic approaches to estimate contingency, only half of the sites said they use computer programs for this purpose, and only half of the sites could state their policy for acceptable confidence levels for estimates. Of those with such established confidence level policy, the sites said they use various levels ranging from 50 percent confidence to 90 percent confidence for their estimates.

In summary, most respondents said that current DOE project risk management policy and guidance is sufficient and available, that no additional guidance is needed, and that current DOE project and risk management training courses were sufficient for their needs. However, the wide disparity of answers relative to practices and approaches indicate that the policy and guidance are not being consistently interpreted and applied across the DOE EM complex.

Issues and Discrepancies in Reported Data

Analysis of some of the inconsistencies and discrepancies noted in the report provides additional insight into areas of weakness in risk management of EM programs. These analyses and consolidated view of some of the reported weaknesses highlight the importance of additional training emphasis in the EM risk management efforts.

Cross-reference of some of the field responses indicate significant inconsistencies and discrepancies in the data reported. For example:

- More respondents indicate that experience/ benchmarking/ lessons learned/ scope changes are reflected in risk assessment plan updates than indicate approved Risk Management Plans.
- Twice as many sites indicate use of a model to assess changes in project assumptions as indicate that they have such a model.
- Fifty percent more respondents indicate use of scheduled impact analysis as a risk management tool than indicate including risk for meeting milestones in the schedule.
- Sites indicating that all contingency analyses and assumptions are documented and justifications are always documented when guide ranges for contingency are not followed are 33 percent more numerous than those sites that have written contingency analyses and estimate procedures.
- Half of the sites that indicate use of probabilistic techniques to estimate contingency do not have an identifiable package of computer software to estimate contingency.
- Only half of the sites indicating application of contingency to schedule have contingency analysis procedures to be applied to project schedules.
- Nearly twice as many respondents indicate application of contingency to durations, cost, or other schedule consideration as indicate the application of contingency to schedule.

Cross-reference of some of the field responses also identifies a significant issue related to applying and improving EM site-wide risk management policies and procedures.

As noted earlier, half of the responding sites do not conduct or offer any project risk management training. Many of the risk management areas that have indicated weaknesses can be directly or indirectly related to training needs. For example:

- Less than half of the sites have approved project risk policies and procedures.
 - ▶ Less than half of the sites have an approved project Risk Management Plan.
 - ▶ Only one site periodically updates the Risk Management Plan.
 - ▶ Half of the sites do not have a system for tracking and closing project risks.
 - ▶ Only half of the sites consider project risk at CD-0 as required by DOE guidance.
 - ▶ Just over half of the sites prepare schedules so that contingency is included.
 - ▶ Just over half of the sites include project risk for meeting milestones in the schedule.
- Eleven of 14 sites consider current DOE project management and project risk management courses are sufficient for their needs.
- Half of the sites do not conduct training in risk management.

The above findings highlight a significant issue.

If current DOE project management and risk management courses are sufficient for site needs, how are the sites going to use these sufficient training opportunities to train the site personnel and develop approved project risk policies and procedures?

The overall training approach across the EM sites should be consistent at some level, guided by EM policy with implementation emphasis at various sites based on individual site needs.

Recommended Path Forward

This path forward is based on the premise that sites will be receptive to risk management improvements, workshops, etc., if DOE policy and management reviews/approvals (e.g., Energy Systems Acquisition Advisory Board [ESAAB]) require strict adherence to sound risk management practices as part of the critical decision and project review processes. Therefore, EM should:

- Develop a process to provide visibility and control of activities relating to risk, including policy interpretation, compliance and guidance, training, and project-specific methodology. The breadth and complexity of the activities identified in the survey will require an EM plan for accomplishing them.
- Issue, clarify or reinforce EM guidance that would require sites to implement, in a formal way, the policies and guidance that DOE has provided related to project risk management. The survey analysis indicates that there is a strong correlation between the perceived need and seriousness of application of risk management methodology at those sites that have approved risk management policies and procedures.

- Use multi-site workshops in lieu of “formal training” to clearly communicate a consistent message relative to DOE project risk management policy, requirements and guidance. The survey indicates this is the preferred approach for the sites. Workshops will be organized to optimize regional/site participation or common cleanup methods as appropriate. EM will use such tools as the draft Project Management Manuals, standard risk software (Crystal Ball, Primavera®, etc.), the DOE Risk Center of Excellence, where appropriate, and site-specific data and project cases to make the workshops practical and meaningful. The workshops will focus on identification of risks, risk handling and mitigation strategies, inclusion of results in the baselines, risk management plans, tracking and managing risks, available contingency determination software, and contingency management practices. (Note: This could be accomplished on a larger DOE-wide scale, rather than for EM-only sites or projects.)
- Develop and conduct EM site-specific risk management workshops, preferably focused on specific projects, that will address the following in a “how to” and “hands-on” fashion:
 1. Identification of risks and uncertainties;
 2. Assignment of ownership and management responsibilities for identified risk;
 3. Development of risk handling and mitigation strategies and approaches;
 4. Refinement of baselines to include planned risk mitigation activities (cost and schedule);
 5. Development of project risk management plans;
 6. Contracting and acquisition strategies and techniques for mitigating or assigning risks;
 7. Tools and methods for tracking and managing risks, including periodic reassessment and updating of risk databases;
 8. Cost and schedule risk analysis tools and techniques, including contingency estimation and budgeting; and
 9. Contingency management practices and procedures.
- Develop and issue additional policies and guidance as their need becomes clearly identified and articulated.

1.0 INTRODUCTION

1.1 Purpose of the Survey

This survey has been designed and executed to support DOE's ongoing efforts to maintain a high level of management expertise in program and project management for the acquisition of capital assets. The survey is intended to provide guidance to DOE's Office of Environmental Management (EM) for their efforts to assure that all elements of risk associated with their projects have received appropriate consideration throughout the life cycle of an EM project.

DOE has issued Order 413.3, *Program and Project Management for the Acquisition of Capital Assets* (dated October 13, 2000) and the supporting *Program and Project Management* and *Project Management Practices* manuals (dated October 2000). These documents are intended to become the basis for delivering projects satisfying mission requirements, on schedule, and within budget. Both documents place great emphasis on project risk management including planning, identification, quantification, handling, impact determination and reporting and tracking. This is consistent with the present increased DOE and Office of Management and Budget emphasis in this area.

In addition, EM's Office of Project Management (EM-6) has integrated the use of the Environmental Management Project Definition Rating Index (EM•PDRI) into the EM management system to assess the status of projects. The EM•PDRI includes an assessment of project risk management.

Although it is recognized that the elements of risk vary from project to project, it is important that EM have a consistent methodology for addressing risk and any cost/schedule allowances for contingencies. EM-6 initiated a three part Risk Management Survey to characterize this issue for the Assistant Secretary for Environmental Management.

The survey was developed to determine the current levels of project risk management and contingency determination, and to solicit comments related to improving the process of risk management for EM projects. A "project" is used in the survey as defined in DOE Order 413.3. The survey was developed to minimize the time required to respond. It was recognized that each field office would have differing risk programs depending on the type and status of their projects. The sites were encouraged to incorporate comments to highlight their particular situation.

1.2 Purpose of the Report

The purpose of this report is to augment the focus and simplicity of the survey and related responses with analyses designed to identify:

- Technical comparisons of the approaches at various sites to manage risk;
- The degree of implementation of risk management at the sites;

- The degree of success for implementation of risk management at the sites;
- The areas of potential improvement of risk management at the sites; and
- Specific recommendations for EM to implement a process to strengthen the management of project risk at all EM sites.

1.3 EM Sites Participating

The following DOE EM sites participated in this survey:

	Site	Name of Respondent	Title
INEEL	Idaho National Engineering and Environmental Laboratory	Gordon McClellan	Senior Project Manager
OAK	Oakland Operations Office	Anne Sun Ross Champion	Cost Estimator Project Coordinator
ORP	Office of River Protection/River Protection Project	Vincent Saladin	Risk/Decision Manager
NTS	Nevada Test Site	Bobbie McClure Elizabeth Hepburn Ray Patterson	DOE/NV Program Integration Mgr Project Controls & Planning Mgr, IT Corp. Program Integration, Bechtel Nevada
AEMP	Ashtabula Environmental Management Project	Tom E. Williams	AEMP Director
CEMP	Columbus Environmental Management Project	Tom Baillieul	Project Director
FEMP	Fernald Environmental Management Project	Wayne Pasko	Deputy Assistant Director for Environmental Management
MEMP	Miamisburg Environmental Management Project	J. Johnson	General Engineer
WVDP	West Valley Demonstration Project	Lisa Maul	Program Analyst, DOE/OH-CFO
OR	Oak Ridge Operations Office	Barbara Brower	Program Integration Team Leader
RF	Rocky Flats Closure Project	Frazer R. Lockhart Greg Moore	Acting Asst Mgr, Closure Management General Engineer
SRS ER	Savannah River Site - Environmental Restoration	Paul Huber	Environmental Restoration Deputy Program Manager
SRS TP	Savannah River Site - Traditional Projects	Philip H. Porter	Manager of Project Support
AL	Albuquerque Operations Office - Environmental Restoration	Ray Wood, Bob Ratzer, Deborah Griswald	ER Program Management Team

1.4 Report Methodology

This report presents the results of a survey on how risk and contingency is handled at DOE EM sites. Fourteen sites responded and all responses were used for this report. The survey was designed to be comprehensive, but with a minimized impact on site resources. A systematic approach was developed to collate, reduce and analyze the survey results sufficiently to understand the technical underpinnings, degree of implementation, degree of success, and areas of potential improvement for risk management activities.

In regard to future recommended actions, DOE should be able to address in hierarchical order: policy guidance; policy compliance and/or implementation; and training (including adequacy of technical underpinnings).

The survey was structured in three parts as follows:

Part I	Project Risk Management	To assess the risk management practices that are currently in place across EM.
Part II	Contingency Application	To identify how risk is presently quantified in contingency allowances (cost and schedule). This was included separately in the survey because of its importance in the DOE baseline and budgeting process.
Part III	Future Recommended Actions	To identify methods for improving EM consistency in meeting the project risk requirements of the new DOE Order 413.3.

The results of the survey relating to Parts I, II, and III are assessed and presented, respectively, in Sections 2.0, 3.0, and 4.0 of this report.

Sections 2.0 and 3.0 emphasize the compliance and training aspects of DOE's policies and guidance relating to project risk management and management of contingency.

Section 4.0 was designed to solicit data from the field that could provide additional insights where DOE's project risk management could be strengthened. It emphasizes future recommended actions, and provides a more integrated assessment of where policy, compliance with policy and guidance, training, and the adequacy of technical underpinnings can be addressed in an integrated and complete manner.

Section 5.0 provides a "Summary of Recommended Follow-up Actions" with emphasis on completeness, integration, and priority of the report's recommendations.

2.0 SURVEY RESULTS:

PART I - PROJECT RISK MANAGEMENT

Part I of the survey was designed to solicit data from the field that could provide insights where EM's project risk management could be strengthened.

Policy guidance and training are also addressed in Sections 3.0 and 4.0 of this report. Accordingly this section emphasizes the policy compliance with, and implementation of, EM's level of project risk management. The adequacy of DOE and EM guidance and training will be addressed more fully in Section 4.0 of this report.

Compliance and implementation comes at two levels, that is: (1) actual consideration of the requirements; and (2) content of consideration. This survey was designed to assess consideration and content of compliance and implementation through one management and six technical areas of assessment, namely regulatory, cost, schedule, procurement, budget/finance, and training. The responses to the survey are assessed in the following related sections.

2.1 General Risk Management

2.1.1 Observations

Questions and responses from the survey relating to general risk management are as follows:

Part I - Project Risk Management Questions - Management				Yes	No
1	Does your organization have approved project risk policies and procedures?			8	6
2	Does your organization have a dedicated project risk management group?			4	10
3	Does your organization have an approved project Risk Management Plan which considers project size, complexity, degree of scope definition, technical/cost/schedule or other facets of risk?				
	Project Size			7	7
	Complexity			8	6
	Degree of Scope Definition			8	6
	Other			8	5
		Monthly	Quarterly	As Req'd	Other
4	How often is the Plan updated?	0	1	5	6
				Yes	No
5	Is experience/benchmarking/lessons learned/scope changes reflected in the risk assessment plan update?			10	2

		No Report	Monthly	As Req'd	Other
6	How often does your organization publish a project risk management report?	7	0	3	4
		Yes	No	In the Past	
7	Do you or have you in the past used the DOE Risk Center of Excellence for risk analysis/guidance?	3	9	2	
		DOE	Own Policy	Other	
8	What guidance is used for project risk determination?	8	8	3	
		Yes	No	Other	
9	Is the project risk determined by a multi-discipline working group?	13	1	0	
10	Is the probability that an undesired event will occur assessed and quantified?	11	3		
11	Is a project risk mitigation plan issued and updated?	6	7		
12	Is there a system for tracking and closing project risks?	6	7		
13	Are risks assigned to specific action officers?	8	6		
14	Are risk management actions, themselves, tracked (e.g., green, amber, red) as part of the risk management process?	5	9		
		None	0-5	5-10	Over 10
15	How many projects have been subjected to formal project risk analysis?	3	5	3	3
16	What results have been attained from the project risk management process?				
	Contingency available to mitigate risk	7			
	Risk mitigated without contingency	8			
	Schedule Extended	9			
	Other	6			
		CD-0	CD-1	CD-2	CD-3
17	At what stage of the Critical Decision (CD) process is project risk assessment initiated?	7	2	2	1
		Yes	No		
18	Is the risk associated with the interaction with other DOE sites considered?	12	2		

2.1.2 Assessments

Six of 14 responses to Question I-1 indicate that organizations do not have approved project risk policies and procedures. This would indicate that there is no formal or institutional compliance with previous DOE policies in DOE Order 430.1A, the *Joint Program Office Direction on Project Management*, and the related *Good Practice Guide* (GPG-032A). This status would not provide formal or institutional compliance with the current DOE Order 413.3.

In response to Question I-2, only four of 14 respondents indicated that they have a dedicated project risk management group. This is a disappointing response considering the importance and complexity of project risk management.

Six of 14 responses to Question I-3 indicate that organizations do not have an approved project Risk Management Plan. This would again indicate that there is no formal or institutional compliance with previous DOE policies in DOE Order 430.1A, and the related *Good Practice Guide*. This status would not provide formal or institutional compliance with DOE Order 413.3.

Responses to Question I-4 indicate that of the six sites that have a management plan, five update the plan “as required” and one updates the plan “quarterly.” Six sites indicated “Other,” including five “no responses.” This is a reasonable response.

In the responses to Question I-5, an anomaly is noted. Ten of 12 respondents indicate that experience/ benchmarking/ lessons learned/ scope changes are reflected in their risk assessment plan updates. Clearly, many of these updates must be related to unapproved or undeveloped plans.

Responses to Question I-6 indicate that seven out of 14 sites do not publish a risk management report. This is consistent with the lack of a plan or procedure that would require such reports.

In response to Question I-7 five sites use or have used the DOE Risk Center of Excellence for risk analysis/guidance. This raises a question about the effectiveness of these resources. An analysis of which sites are using the Risk Center of Excellence was made to provide insight into this question. For example, are the sites with more aggressive risk management programs the ones that are using the resource?

Figure 2-1 displays 13 responding sites (one site did not respond to Question II-29) as a function of two parameters:

- 1) Answered “yes,” “yes, in the past,” or “no” to Question I-7: Do you or have you in the past used the DOE Risk Center of Excellence for risk analysis/guidance? and
- 2) Answered “yes” or “no” to Question II-29: Does your organization apply contingency to schedules?

Also indicated with an asterisk are the sites that have approved risk policies and procedures as indicated in Question I-1.

Two of four sites that use the DOE Risk Center of Excellence, and five of nine sites that do not use the Risk Center, apply contingency to schedule. Two of four sites that use the DOE Risk Center of

Excellence and six of nine sites that do not use the DOE Risk Center of Excellence have approved risk policies and procedures.

Figure 2-1 indicates no correlation in the use of the DOE Risk Center of Excellence with the aggressiveness of the risk management programs at the site, at least not with the two indicators used in the analysis.

The responses to Question I-8 indicate that about 50 percent of the sites use their own policy and 50 percent use DOE's policy for project risk

determination. It cannot be determined from the responses to what extent the site policies are consistent with DOE policy. Only three sites indicate using both DOE's and their own guidance, which is probably the most favorable response. Three sites are using "other" unspecified guidance. An interesting analysis would be to determine if the sites that use their own policies and guidance are the ones that have plans and procedures; or, are they the sites that are implementing DOE's policies? This analysis is presented in Section 4.0.

Responses to Question I-9 indicate that 13 of 14 sites use a multi-disciplined working group to determine project risk. This is a favorable response.

In response to more specific questions, there is an indication of awareness of risk and an attempt to address the related issues. As an example, 11 "yes" responses were received to Question I-10, "Is the probability that an undesired event will occur assessed and quantified?"

In response to Question I-11, approximately half of the respondents indicated that they did not issue and update a risk mitigation plan. It would be expected that if there is no plan, there is no tracking. However, a check of the data indicates that four major sites (SR, WVDP, INEEL, and FEMP) have a policy but do not issue a report. A similar number of responses were received for Question I-12, "Is there a system for tracking and closing project risks?" And, in response to Question I-14, "Are risk management actions themselves tracked as part of the process?," nine of 14 respondents said no.

In response to Question I-13, eight of 14 respondents indicate that risks are assigned to specific action officers. This is an encouraging response.

Figure 2-1

Question I-7. Do you or have you in the past used the DOE Risk Center of Excellence for risk analysis/guidance?			
Question II-29. Does your organization apply contingency to schedules?	YES	YES, in Past	NO
	OAK WVDP*		INEEL* ORP NV* MEMP SRS TP*
NO		AL* CEMP	AEMP FEMP* RF* SRS ER*

*Indicates that site has approved risk policy and procedures as indicated in Question I-1.
 **OR did not respond to Question II-29.

The responses to Question I-15 indicate that for the sites that responded, three sites conduct no risk analyses, five sites have conducted between zero and five analyses, three sites have conducted between five and 10, and three sites have conducted over 10 risk analyses. This would indicate that the sites believe they are conducting formal risk assessment in spite of the lack of formal requirements and tracking. It is significant to note that three of the sites have not conducted any formal project risk analyses.

Question I-17 asked, “At what stage of the Critical Decision (CD) process is project risk assessment initiated?” The responses were CD-0 (7), CD-1 (2), CD-2 (2), and CD-3 (1). This response indicates a degree of non-compliance with DOE Order 413.3 and its predecessor Order and *Good Practice Guides* that require risk planning at the beginning of each phase of project development.

However, Question I-16 provides a bottom line insight into the effectiveness of EM’s risk management program. Question I-16 asks, “What results have been attained from the project risk management process?” The choice of “Schedule Extended” (9) was more prevalent than any other choice listed, which were, “Contingency available to mitigate risk” (7), “Risk mitigated without contingency” (8), and “Other” (6).

Management attention is required to address the compliance weakness in EM’s Risk Management Program and related policies. The weakness in formal implementation at the sites is leading to identifiable weaknesses in implementation that would provide confidence that project risks are being identified, mitigated, tracked, reported, and controlled.

2.1.3 Recommendations

EM should strengthen their capability to measure and assure that the sites implement, in a formal way, the policies and guidance that DOE has provided related to project risk management.

2.2 Technical Risks

2.2.1 Observations

Questions and answers from Part I of the survey relating to technical risks are as follows:

Part I - Project Risk Management Questions - Technical		Yes	No
19	Is technical risk included in the project risk assessment?	13	1
20	Are technical process models used to assess risk?	9	5
21	Is characterization of waste included in the risk assessment?	12	2
22	Is transportation and disposal included in the project risk assessment?	12	2
23	Are other technical issues included in the risk assessment? Specify.	10	3

2.2.2 Assessments

As was evident in the management analysis, the more specific the question the more positive the response that the concern had been considered.

Responses to Questions I-19 through I-23 indicate that the vast majority of the sites are including matters related to technical risks in their project risk assessments.

Awareness of technical risks and the need to mitigate them appears to be properly included in the assessment. However, the appropriateness of identification and management of these risks cannot be judged from an assessment, such as this survey, except by identification of bottom line results that would indicate specific weaknesses. The survey was not designed to ferret out such weaknesses and none were observed.

2.2.3 Recommendations

EM should target management attention and/or training to strengthen the management of technical risk at specific sites where weakness in this area is evident.

2.3 Regulatory Risks

2.3.1 Observations

Questions and answers from Part I of the survey relating to regulatory risks are as follows:

Part I - Project Risk Management Questions - Regulatory		Yes	No
24	Are regulatory risks included in the project risk assessment?	10	4
25	Are state/local government risks included?	10	4
26	Are stakeholder risks included?	10	4

2.3.2 Assessments

Responses to Questions I-24, I-25, and I-26 indicate that approximately 70 percent of the respondents include regulatory, state and local government, or stakeholder risks in their risk assessments. The results of the EM-6 Independent Project Reviews has verified this data.

2.3.3 Recommendations

EM should issue necessary policy guidance and follow-up with workshops, as needed, to require EM projects to include regulatory, state and local government, and stakeholder considerations in their risk assessments.

2.4 Cost Risks

2.4.1 Observations

Questions and answers from Part I of the survey relating to cost risks are as follows:

Part I - Project Risk Management Questions - Cost			
27	Does a multi-discipline group or the cost estimator determine the cost range of the project risk?	Multi-discipline	6
		Estimator	0
		Both Together	7
		Other	1
		Yes	No
28	Are schedules prepared so that contingency is included?	8	5
29	Is individual activity risk assigned to the year in which it is expected to occur?	12	2
30	Is the project risk assessment used to determine contingency?	13	1

2.4.2 Assessments

Responses to Question I-27 through I-30 indicate that:

- Only one site does not use a multi-disciplined group to determine the cost range of the project risk;
- Five sites do not prepare schedules so that contingency is included (including one site that responded both ‘yes’ and ‘no’);
- Only two sites do not assign individual activity risk to the year in which it is expected to occur; and
- Only one site does not use project risk assessment to determine contingency.

The indication that five of the sites do not prepare schedules that include contingency is not a favorable response.

2.4.3 Recommendations

EM should target management attention and/or training to strengthen management of contingency costs at specific sites showing weaknesses. (Costs related to “not including contingency,” in the preparation of schedules are also addressed in a policy recommendation in Sections 2.5.3 and 3.5.3.)

2.5 Schedule Risks

2.5.1 Observations

The following table presents questions and answers from Part I of the survey relating to schedule risks:

Part I - Project Risk Management Questions - Schedule		Yes	No
31	Is project risk for meeting milestones (including regulatory) included in the schedule?	8	6
32	Is risk determined for individual activities?	11	3
33	Are schedule and Critical Path sensitivity analyses completed?	10	4

2.5.2 Assessments

The responses to the questions in this section are significant and troubling. Responses to Questions I-31, I-32 and I-33 indicate that schedule risks are **not** being adequately addressed at the sites. Six of 14 (43 percent) respondents did not include the risk for meeting milestones (including regulatory) in the schedule. Three of 14 respondents did not determine risk for individual schedule activities. Four of 14 respondents have not completed Critical Path sensitivity analyses. This is significant when included with the responses to Question I-16, which revealed that nine of 14 (64 percent) sites extended their schedule to accommodate risk.

2.5.3 Recommendations

EM should issue necessary policy guidance and follow-up with workshops, as needed, to require EM projects to include management of schedule risks, including contingency, in their risk assessments. Such guidance should require a Contingency Management Plan, using a graded approach that includes use of analysis and application procedures for applying contingency to project schedules.

2.6 Procurement Risks

2.6.1 Observations

Questions and answers from Part I of the survey relating to procurement risks are as follows:

Part I - Project Risk Management Questions - Procurement		Yes	No
34	Is project risk for long-lead procurements considered (including vendor issues)?	10	4
35	Is project risk of GFE considered (including vendor issues)?	7	7
36	Is the risk of using new contractors considered?	9	4

2.6.2 Assessments

Questions I-34, I-35 and I-36 indicate that procurement risks are **not** being fully considered at the sites. Four of 14 respondents did not consider the risk of long-lead procurements (including vendor issues) in their risk assessments. Seven of 14 respondents did not consider the risk of government-furnished equipment (GFE) in their risk assessments. Four of 14 respondents did not consider the risk involved in using new contractors.

2.6.3 Recommendations

DOE and EM should issue necessary policy guidance and follow-up with workshops, as needed, to require EM projects to address the management of procurement risks, such as long-lead procurement, GFE, and new vendors, in their risk assessments.

2.7 Budget/Financial Risks

2.7.1 Observations

Questions and responses from Part I of the survey relating to budget and financial risks are given in the following table.

Part I - Project Risk Management Questions - Budget/Financial				Yes	No
37	Is a funding profile approved for specific projects and used as a basis for the risk assessment?			11	2
38	Are funding profile sensitivity analyses run?			9	5
39	Does your organization have a model which assesses the economic, production, and/or other implications of changes to project assumptions?			5	9
		Annually	Quarterly	On Request	As Required
40	How often is the model run?	1	0	2	6
				Yes	No
41	Are other budget/financial issues considered? Specify.			6	6

2.7.2 Assessments

It is our experience (and the data shows) that funding is a most significant basis for risk assessment, but there is minimal ‘institutionalization’ of the process in models. This is particularly significant in ‘what if’ analysis. Risks associated with alternative funding profiles are not always considered, and the survey results indicate very few sites have models for this process. For example, five of 14 respondents do not conduct funding profile sensitivity analyses (Question I-38) and nine of 14 respondents do not have a model to assess changes to project assumptions (Question I-39).

While the responses to Question I-39 indicate that only five sites have a model to assess changes to project assumptions, the responses to Question I-40 indicate that nine sites run some model. Of the five sites that actually indicate organizational use of a model, one uses the model “on request” and

four “as required.” No site conducted a periodic “quarterly” or annual review except one of the sites that did not have a model.

Reviews of budget/financial issues, to the extent that they are being performed are conducted on request or as required, which means probably after the impact is already being observed with reduced opportunity for mitigation.

There is a strong indication by the response to Question I-37 that the sites (11 “yes”) approve a funding profile for use as a basis for risk assessment. However, the responses to the other questions in this section indicate that the funding profile for the project may be approved, but the risk of potential changes to the funding profile is not being assessed.

Question I-41 asked if budget/financial considerations other than funding profile and economic, production and/or other implications of changes to project assumption were considered. Eight respondents answered “no” or provided no response. Two respondents answered “yes” but did not indicate what other considerations. Four respondents answered “yes” and indicated that available funding, site priorities, and size of project were considered.

2.7.3 Recommendations

EM should issue necessary policy guidance and follow-up with workshops, as needed, to require EM projects to include management of budget and financial risks, such as changes in funding profile, in their risk assessments.

2.8 Risk Training

2.8.1 Observations

The only question in Part I of the survey pertaining to risk training follows:

Part I - Project Risk Management Questions - Training		No	DOE Course	Outside DOE	In-House Course
42	Does your organization conduct training in risk management?	7	3	3	5

2.8.2 Assessments

Fifty percent of the respondents to Question I-42 do not conduct training in risk management. This response indicates that one of the core themes of the issue is not recognized. Project risks cannot be controlled unless they are understood and they cannot be understood unless there is appropriate training.

2.8.3 Recommendations

EM should establish a top-level focus on the basic objective, which is, “understanding that project risk is important to control contingency and other project costs and schedule.” Using the results of this survey and its initial analysis, EM should charter an appropriate group of headquarters, field, and support personnel to provide an early evaluation, and recommendations with continuing emphasis on achieving this objective.

2.9 Tools and Methodology

2.9.1 Observations

The choices given in the survey for risk tools and methodology used are listed in the following table.

Part I - Project Risk Management Questions - Tools and Methodology		
43	What risk management tools and methodology are used?	
	Identification	
	Work Breakdown Structure	12
	EM•PDRI	8
	Interviewing	10
	Flow Charting	8
	Checklists	8
	Other	2
	Quantification	
	Simulation Techniques	5
	Monetary Impact Analysis	9
	Schedule Impact Analysis	12
	PERT/CPM	10
	Failure Modes and Effects Analysis	0
	Risk Specialists Impacts	1
	Other	0
	Response Development and Control	
	Contingency Plans	9
	Alternative Approaches and Strategies	12
	Risk Transfer to Contractors/Subcontractors	6
	Insurance Plans	1
	Other	1
	Reporting and Tracking	
	Reporting and Tracking Documents	10
	Responsible Parties for Each Identified Risk	6
	Risk Handling Strategies Identified	6
	Other	0

2.9.2 Assessments

Responses to Question I-43 indicate almost all sites are using some management analysis tools, especially in the areas of “risk identification” with analyses related to the Work Breakdown Structure (12 “yes”), and risk quantification with analyses related to Schedule Impact Analysis (12 “yes”).

Queries in other areas of “risk identification” and “risk quantification” tools and methodology indicate weaker responses.

The indication that 12 sites use schedule impact analysis as a quantification tool is inconsistent with the response to Question I-31 (meeting milestones) but consistent with Question I-32. It is significant to note that the EM-6 Independent Project Review Teams have seen little evidence of schedule risk quantification, despite the overwhelming response to Question I-43.

Responses to the use of “Response Development and Control” tools and methodology indicate 86 percent “yes” for Alternative Approaches and Strategies. This is an area strongly implemented in DOE policy. Other areas did not receive the same attention at the sites. Approximately 64 percent use contingency plans, approximately 43 percent consider risk transfer to contractors/subcontractors, and one site uses insurance plans.

Responses to the use of “Reporting and Tracking” tools and methodology indicate “yes” responses to Reporting and Tracking Documents (71 percent), Responsible Parties for Each Identified Risk (38 percent), and Risk Handling Strategies Identified (43 percent). The weakness in this area is symptomatic of the lack of serious implementation of reporting and tracking and reflects the user’s assessment that use, or greater use, of risk management offers little, or no benefit. If benefits were expected, it would be tracked to assure the benefits are realized.

2.9.3 Recommendations

EM should assure that use of appropriate tools and methodologies are included in workshops focused on policy implementation or training. Of special note is the need for improved management attention for the areas of reporting and tracking methodology and awareness.

3.0 SURVEY RESULTS:

PART II - CONTINGENCY APPLICATION

Increasingly, over time, and especially since the publication of DOE Order 430.1A in 1998, DOE has emphasized the relationship between the determination of project risk, the management of these risks, and the development of appropriate project contingency.

Part II of the survey was designed to solicit data from the field that could provide insights into how the relationship between project risk and contingency is understood and implemented in the field, and how risk management could be strengthened in EM projects.

Policy guidance and training are also addressed in Sections 2.0 and 4.0 of this report. Accordingly, this section emphasizes compliance with and implementation of the policies related to project contingency management. The actual adequacy of DOE and EM guidance will be addressed in Section 4.0 of this report where policy, compliance with policy and guidance, training, and the adequacy of technical underpinnings can be addressed in an integrated and more complete manner.

Compliance and implementation comes at two levels, that is: (1) actual consideration of the requirements; and (2) content of consideration. This survey was designed to assess consideration and content of compliance and subsequent implementation through five areas of inquiry: Policies and Procedures, Methodologies, Contingency Percentages, Contingency Allocation and Use, and Schedule Contingency. The responses to the survey are assessed in the following related sections.

3.1 Policies and Procedures

3.1.1 Observations

The following table presents questions and answers from Part II of the survey relating to policies and procedures:

Part II - Contingency Application - Policies and Procedures					Yes	No	
1	Does your organization have written contingency analysis and estimate procedures (which considers project size, complexity, degree of scope definition, technical risk and other considerations) to be applied on all cost estimates?				9	5	
2	Is contingency contractually excluded from any/all contracts at your site? Explain				5	9	
		DOE	Own Policy	AACE	Other Federal	Other	
3	What guidance does your organization use for setting contingency numbers?		6	8	2	1	2

					Yes	No				
4	Does your organization have written contingency analysis and estimate procedures that are specific to environmental management (EM) projects?				8	5				
				DOE	Own Policy	AACE	Other Federal	Other		
5	If so, what guidance does your organization use for setting contingency numbers?				4	5	1	1	2	
								Yes	No	
6	Are all contingency analysis and assumptions documented?				12					1
7	Are justifications always documented in writing when guide ranges for contingency are not followed?				9					2
				Requires Usage		No	Optional	Other		
11	Does your organization utilize Contingency Management Plans?				2		9	1	1	
				DOE Site		M&O Contractor		Other		
	Who controls contingency? Specify.				7		5		1	
							Yes		No	
33	Does your project have a Contingency Management Plan/Procedure?				4					9

3.1.2 Assessments

The responses to Questions II-1 and II-33 provide the fundamental and leading insight into the status of EM's attempt to understand project risks and improve the relationship between project risk and project contingency. Only nine of 14 respondents have written contingency analysis and estimate procedures to be applied on all cost estimates, and only five of 14 respondents have a Contingency Management Plan/Procedure. This is echoed in the written comments which indicate risk/contingency policy is followed, but not formally documented. Compliance with DOE policy and guidance falls off from here.

In response to Question II-6, 12 respondents indicate that all contingency analysis and assumptions are documented. Considering the responses to Questions II-1 and II-11, this appears unlikely. How are such matters tracked without contingency analysis and estimate procedures?

In response to Question II-7, nine of 11 respondents indicate that justifications are always documented in writing when guide ranges for contingency are not followed. How are guide ranges identified if there are no contingency analysis and estimate procedures?

Responses to Question II-11 reveal that only two sites require their organization to utilize Contingency Management Plans. Also, the responses to Question II-11 indicate that the M&O contractor controls the contingency at over half of the sites. How this is done while maintaining appropriate DOE controls and accountability would appear to require specific site policies and procedures. More investigation is required to further clarify this issue, in light of the limited information provided. However, this matter should receive appropriate consideration during the development of site contingency analysis and estimate procedures.

Responses to Question II-2 indicate that only five of 14 respondents contractually exclude contingency from contracts at their site. The impact to those sites where contingency is contractually included would be an interesting investigation.

Responses to Question II-3 indicate that three sites use DOE guidance for setting contingency numbers. Four sites use their own. Four sites use both DOE guidance and their own. Three sites use other guidance, and two sites augment DOE guidance with other AACE or federal guidance. One site did not respond. The relevance of this response is discussed in greater detail in Section 4.0.

3.1.3 Recommendations

DOE and EM should issue necessary policy guidance to: (1) require contingency to be included in all budget requests and/or baselines; and (2) require contingency estimates to be included in budget requests and/or baselines.

The policy directive should require site implementation of contingency analysis and estimate procedures appropriate to the projects at the site. These procedures should include development of responsibility, accountability, and allocation between DOE and the M&O contractor.

3.2 Methodologies

3.2.1 Observations

The questions and answers from Part II of the survey pertaining to methodologies are given in the following table.

Part II - Contingency Application Questions - Methodologies						
8	Does your organization use deterministic or probabilistic approaches to estimating contingency?	Deterministic	Probabilistic		Both	
		0	4		9	
				Yes	No	
9	Does your organization use computer programs such as <i>Independent Cost Estimating Contingency Analyzer</i> (ICECAN), <i>Crystal Ball</i> , or other software to estimate contingency?				6	6
		ICECAN	Crystal Ball	@Risk	Decision Pro	Other
10	If so, what software do you use?	0	3	2	0	6

12	To what level of detail do you estimate contingency?				Yes	No
	At the summary or project level?				9	4
	Major line items only?				6	4
	Individual cost elements or line items?				7	4
	If contingencies were analyzed by major line items, approximately how many items are evaluated?	1-20	20-40	40-60	60-80	Other
		4	0	1	0	2
					Yes	No
13	Are contingency amounts evaluated for reasonableness?				12	1
14	When performing probabilistic contingency analysis, how do you identify risk (i.e., four items that could impact cost or schedule, how do you assign probabilities, maximum and minimum cost and schedule ranges, distribution types)?					
					Yes	No
	Use of historical data?				11	2
	Individual's best professional estimate?				13	0
	Contact vendors/use of commercial cost database?				9	4
	Group or team input from various disciplines/Delphi method?				11	2
	Other methods? Specify.				3	5
	Are the results documented?				13	0
					Individual	Team
	Is the contingency calculated by an individual or as a team?				2	11
		50/50	10/90	20/80	30/70	Other
15	What confidence interval (over run/under run) is used to determine contingency amount?	2	1	4	0	7

3.2.2 Assessments

The responses to Question II-8 indicate that all of the responding sites (one site that does not have contingency at all did not answer most of the Part II questions) either use probabilistic or a combination of probabilistic and deterministic approaches to estimate contingency. This is a very favorable response, yet seems somewhat inconsistent with the results of recent EM-6 Independent Project Reviews.

The responses to Questions II-9 and II-10 indicate that approximately half of the sites do not use an identifiable package of computer software to estimate contingency. This is inconsistent with the responses to Question II-8. Although all respondents indicated use of probabilistic techniques, only six stated that software was used. It is unclear how probabilistic approaches can be used without some software applications.

While the degree of utilization and sophistication of computer software would be expected to vary at the sites, there does appear to be a need for the utilization of potentially beneficial programs and software. A workshop designed to assure that all sites are aware of potential benefits of this supporting technology would appear to have merit.

Responses to Question II-12 indicate that two-thirds of the respondents estimate contingency at a summary level for the entire project, while the other one-third identify contingency by individual cost elements or major line items. Again, there appears to be no complex-wide consistency in contingency determination and presentation as will be required to support risk-based budgeting initiatives.

Responses to Question II-13 indicate that 90 percent of the sites evaluate contingency amounts for reasonableness. However, the fact that one site does not evaluate contingency is disconcerting.

Question II-14 requests information to determine the breadth of approach, including techniques, being used at the sites to identify risk. The site responses indicate a broad use of the available techniques, and the results are documented by all sites. Over 80 percent of the sites utilize a team approach, as opposed to an individual, to calculate contingency.

Although all sites indicate that probabilistic approaches are used for contingency determination (see Question II-8), there is no clear indication of this in the responses to Question II-15. Seven meaningful responses were received to this question. One site indicates that it attempts to set contingency at that point of a probability profile where there would only be a 10 percent chance of overrun. This is generally in agreement with new DOE project management guidance. However, four sites indicate that a 20 percent overrun probability is acceptable, and two other sites set contingency at a 50/50 point. Clearly, there should be a DOE standard that identifies the degree of risk/uncertainty that would be acceptable. Recent DOE project management guidance and workshops would appear to favor setting project performance baselines at a level that would have only a 10 to 15 percent probability of overrun.

3.2.3 Recommendations

EM should assure that use of appropriate tools and methodologies are included in workshops focused on policy implementation or training. Of special note is the need for improved management attention for the areas of contingency analysis and reporting and tracking methodology and awareness.

EM should develop a methodology workshop designed to increase understanding of the available technology and how it could be used in a graded and/or focused approach to strengthen management at the EM sites.

DOE and EM should establish a standard probability overrun percentage as a basis for contingency determination. Other probabilities above and below this standard should also be established for sensitivity runs to allow targeting specific project requirements, and determining a managerially accepted baseline contingency.

3.3 Contingency Percentages

3.3.1 Observations

Questions and answers from Part II of the survey pertaining to contingency percentages are given in the following table.

Part II - Contingency Application Questions - Percentages		0-15%	15-50%	50-75%	75-100%	Other
16	For EM projects, what contingency percentage do you generally apply to the baseline estimate at the CD-0 (Mission Need) stage?	2	4	1	0	7
17	For EM projects, what contingency percentage do you generally apply to the baseline estimate at the CD-1 (Preliminary Baseline) stage?	2	3	1	0	8
		0-5%	5-15%	15-25%	25-50%	Other
18	For EM projects, what contingency percentage do you generally apply to the baseline estimate at the CD-2 (Performance Baseline) stage?	2	2	2	1	6
19	For EM projects, what contingency percentage do you generally apply to the baseline estimate at the CD-3 (Start of Construction) stage?	0	3	3	0	7
20	For EM projects, what contingency percentage do you generally apply to contracts, prior to bid and award?	2	5	0	0	6
21	For EM projects, what contingency percentage do you generally apply for O&M project estimates?	2	1	1	0	7

3.3.2 Assessments

Questions II-16 through II-19 were designed to provide insight into the contingency allowances at the sites at various stages of the Critical Decision (CD) process. It was recognized that the EM projects being surveyed were not the run-of-the-mill projects and the survey allowed for contingencies up to 100 percent. This latitude was not necessary. The maximum contingency being used at the sites surveyed was 75 percent.

Question II-16 asked what contingency percentage was generally applied to the baseline estimate at the CD-0 stage. The responses from the sites were a problem. Five respondents indicated “other” without comment. One respondent indicated “other” with the comment “it is dependent” or “it varies.” Another respondent indicated “other” (15-40 percent) when a category for 15-50 percent existed; and one respondent did not respond. From theoretical considerations, the matrix of contingency should show a decreasing contingency over time. For those sites that responded, this was observed with one exception.

The value of the survey is limited by the special nature of the activities surveyed and the small number of data points even if all of the sites had responded in a more useful manner. However, it is clear from the responses that some focused efforts by EM in this area could have significant potential payoffs. One could consider earned value incentives or requirements that the theoretical considerations discussed earlier actually materialize.

Question II-20 was designed to provide insight into the contingency allowances at the sites that are applied to contracts prior to bid and award. The responses to this question were also a problem. Six respondents indicated “other” without comment. One respondent indicated “other” with the comment “it varies,” and one respondent did not respond.

Question II-21 was designed to provide insight into the contingency allowances at the sites that have applied for O&M project estimates. The responses to this question were also a problem. Four respondents did not respond. Three respondents indicated “other” without comment. One respondent indicated “other” with the comment “it varies.”

Incentives and/or requirements for EM sites to understand and introduce risk reduction and risk sharing into their contracting arrangements is essential if fixed-price contracts cannot be developed.

3.3.3 Recommendations

EM should consider developing and publishing acceptable contingency ranges based on experience.

EM should develop incentives and requirements for the sites to (1) maximize the use of competitive fixed-price contracts, and (2) define the appropriate contingency if fixed-price contracting cannot be obtained.

3.4 Contingency Allocation and Use

3.4.1 Observations

The following table presents questions and answers from Part II of the survey relating to contingency allocation and use:

Part II - Contingency Application Questions - Allocation and Use		Yes	No
22	For EM projects, do you include contingency in the budget requests? How? Explain	4	7
23	For which of these do you apply contingency and thus include in the contingency estimate?		
	Unplanned or unscheduled activities not part of the baseline?	7	5
	Unexpected congressional budget cuts?	2	10
	Changes to regulatory standards?	6	6
	Acts of God?	2	10
	Major events?	4	7
	Allowances?	3	8
	Other (specify)?	3	4
24	Is Management Reserve used? How (specify)?	9	4

25	In which of the following do you include contingency?				Yes	No		
	Life cycle baseline?				9	2		
	Fiscal year baseline/work plans?				4	7		
	Baseline change proposals/baseline changes?				6	5		
	Fiscal year and life cycle planning budget submissions?				7	4		
	CERCLA/RCRA/other regulatory documentation?				4	7		
	Cost estimates performed for other purposes?				7	3		
	Other? Specify.				3	3		
				Quarterly	Semi-Annually	Annually	As Needed	Other
26	How often does your project reevaluate or update the contingency analysis or estimate?			0	1	4	7	3
			Total Bottom Line	Level 1 WBS	Level 2 WBS	Lower Level WBS		
27	How is contingency spread allocated in estimate reports?			5	0	1	7	
28	How is contingency spread in funding requirements/profile?					Yes		No
	Constant percent each year?					1		11
	Based on forecast of risks?					9		4
	Based on typical allocation curve?					0		12

3.4.2 Assessments

The responses to Question II-22 indicate only about one-third of the responding sites include contingency in the budget request. It would appear that this is a significant budget anomaly, as contingency should be a significant budgeted cost in most of these projects.

Inconsistent definition of contingency allowance across the complex is evident in the response to Question II-23.

In response to Question II-24, nine of the 13 respondents indicated that they use “Management Reserve” for contingency purposes.

Question II-25 requests information to determine what activities are included in contingency matters at the sites. The categories were illustrative and included such designations as life cycle baseline, baseline change proposals, and CERCLA/RCRA regulatory documentation. Again, inconsistent usage of contingency was noted in the responses.

As to how often the contingency analysis or estimate is reevaluated or updated (Question II-26), the responses were: “As Needed” (7), and “Annually” (4). One respondent indicated “as needed,” but at least annually. This would appear to be a good response to the question.

Question II-27 requested how contingency was spread/allocated in estimate reports. There was one response for “Level 2 WBS,” and about 50 percent of the respondents responded at a “Lower Level WBS.” However, approximately 35 percent of the responses indicated “total bottom line.”

Question II-28 requests information related to how contingency is spread in the funding requirements/profile. While only one respondent indicated “yes” to “constant percent each year,” 31 percent of the respondents did not respond positively to “based on forecast of risk.” This is a response which could require EM action.

3.4.3 Recommendations

DOE and EM should issue necessary policy guidance to: (1) require contingency to be included in all budget requests and/or baselines; and (2) require contingency estimates to be included in budget requests and/or baselines.

The policy directive should require site implementation of contingency analysis and estimate procedures appropriate to the projects at the site. These procedures should include development of responsibility, accountability, and allocation between DOE and the M&O contractor.

EM should consider early use of workshops to bring the sites to a consistent level of performance with regard to how contingency is being allocated and used at the sites.

3.5 Schedule Contingency

3.5.1 Observations

The following table presents questions and answers from Part II of the survey relating to schedule contingency:

Part II - Contingency Application Questions - Schedule			Yes	No
29	Does your organization apply contingency to schedules?		7	6
30	Does your organization have a written contingency analysis and procedure to be applied to project schedules?		4	9
		<i>MS Project</i>	<i>Primavera</i>	Other
31	What software program do you use for schedule contingency?	1	8	2
		Durations	Cost	Other
32	How is schedule contingency applied?	8	7	3

3.5.2 Assessments

In response to Question II-29, seven of 13 respondents indicated that their organizations applied contingency to schedule. Question II-30 indicated that only four of these seven respondents had contingency analysis procedures to be applied to project schedules. Thus only 31 percent of the sites are applying contingency to schedule in a visible and disciplined manner.

In response to Question II-31, 11 of the sites indicated the following use of software for schedule contingency: *Microsoft Project* (1), *Primavera* (8), and “Other” (2). The survey assumes that the respondents indicated the software used for schedule formulation and control since only seven respondents indicated that they apply contingency to schedule. In any event, it appears that the sites are generally using state-of-the-art software.

In response to Question II-32 as to how schedule contingency was applied, respondents indicated as follows: “Durations” (8), “Cost” (7), “Other” (3). This has not been observed by the EM-6 Independent Project Review Teams. These responses are also inconsistent with the response that seven sites apply contingency to schedule.

3.5.3 Recommendations

EM should issue necessary policy guidance and follow-up with workshops, as needed, to require EM projects to include management of schedule risks, including contingency, in their risk assessments. Such guidance should require a Contingency Management Plan, using a graded approach that includes use of analysis and application procedures for applying contingency to project schedules.

4.0 SURVEY RESULTS:

PART III - FUTURE RECOMMENDED ACTIONS

With regard to future recommended actions, EM should address in hierarchical order:

- Policy Guidance
- Policy Compliance and/or Implementation
- Training (including adequacy of technical underpinnings)

Sections 2.0 and 3.0 respectively emphasize the compliance aspects of DOE's policies and guidance relating to project risk management and management of contingency.

Part III of the survey was designed to solicit data from the field that could provide additional insights where EM's project risk management could be strengthened. It emphasizes future actions, and provides a more integrated assessment of where policy, compliance with policy and guidance, training, and the adequacy of technical underpinnings can be addressed in an integrated and complete manner.

Part III of the survey was designed to assess Future Recommended Actions through the eyes of the field through subject matter of Policy and Guidance, Training, EM-6 Reviews, and Risk Reporting. The responses to the survey are assessed in the following related sections.

4.1 Policy and Guidance

4.1.1 Observations

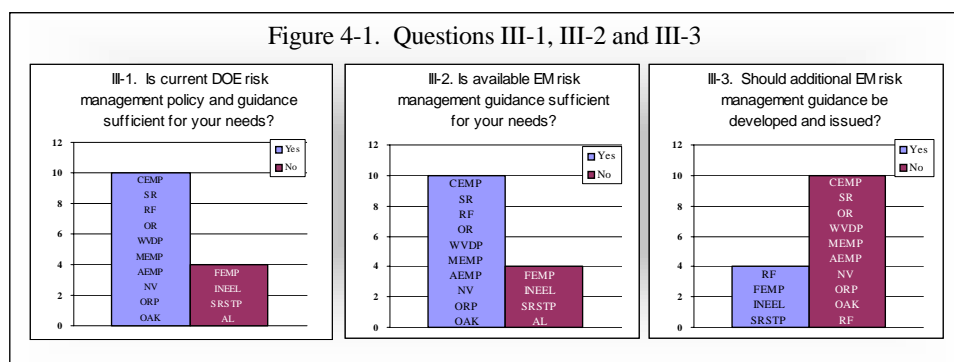
The following table presents questions and answers from Part III of the survey relating to policy and guidance:

Part III - Future Recommended Actions Questions - Policy and Guidance		Yes	No
1	Is current DOE risk management policy and guidance sufficient for your needs?	10	4
2	Is available EM risk management guidance sufficient for your needs?	10	4
3	Should additional EM risk management guidance be developed and issued?	4	10

4.1.2 Assessments

The responses to Questions III-1, III-2, and III-3 indicate a consensus by the field that further guidance from DOE and/or EM is not required.

In response to Questions III-1 and III-2 respectively, 10 of 14 respondents indicate that risk management policy and guidance from DOE and EM is sufficient for their needs.



In response to Question III-3, 10 of 14 respondents indicate that additional policy and guidance from EM should not be developed and issued. One site indicated that additional EM

risk management guidance should be developed and issued even if it was not necessary, and one site indicated that additional risk guidance should not be developed and issued, even though DOE and EM risk management guidance was not sufficient for their needs.

While the responses to Questions III-1, III-2 and III-3 indicate that there is a substantial consensus in the field that DOE and EM risk management guidance is sufficient, responses to questions in Sections 2.0 and 3.0 make it clear that additional policy and/or guidance may be required or at least beneficial. (See the analysis that supports the recommendations in Sections 2.1.3, 2.3.3, 3.1.3, 3.3.3, 3.4.3, and 3.5.3.)

Further analysis of some of the data reported in Sections 2.0 and 3.0 can provide insight into potential weaknesses in EM policies and guidance and also insight into appropriate initial steps to identify and correct the potential weaknesses.

Figure 4-2 displays the 14 responding sites as a function of two parameters:

- 1) Answer “yes” or “no” to Question III-1: Is current DOE risk management policy and guidance sufficient for your needs?
- 2) Answer to Question I-8: What guidance is used for project risk determination? (“DOE,” “Own Policy,” or “Other”)

Also, indicated with an asterisk are the sites that have approved risk policies and procedures as indicated in Question I-1.

While it is noted that the sample size is small, there are some indications worth noting. Eight of the sites are using DOE guidance or a combination of DOE and their own guidance for project risk

determination. Of these eight sites, four indicate that DOE risk management policy and guidance is not sufficient for their needs. All four of these sites have approved risk policies and procedures.

All six sites without approved risk policies and procedures indicate that DOE risk management policy and guidance is sufficient for their needs.

This set of responses offers some indication that the more serious the attempt to implement approved site risk management policies and procedures, the more is the perceived need for additional guidance and/or clarification.

An early follow-up by EM with the four site respondents that indicate a need for additional DOE or EM risk management policy and guidance or clarification could be beneficial to identify potential early improvements. This follow-up with the field would also provide an excellent opportunity to encourage and include field operations into the process of strengthening project risk management.

One could also conclude from this analysis that more emphasis at the sites related to implementing approved risk management policies and procedures could have a beneficial affect on improving the other weakness in project risk management observed in this survey related to site activities that implement project risk management and related training requirements.

4.1.3 Recommendations

EM should strengthen their capability to measure and assure that the sites implement, in a formal way, the policies and guidance that DOE has provided related to project risk management.

EM should follow-up with the four respondents who identified a need for additional guidance from both DOE and EM to ascertain what additional policy guidance would be useful.

Using the results of this survey and its initial analysis, EM should charter an appropriate group of Headquarters, field, and support personnel to provide early and continuing evaluation and recommendations that address the following questions:

- Is the intent of DOE's policy and guidance clear?

Figure 4-2

		Question III-1. Is guidance sufficient?	
		YES	NO
Question I-8. What guidance is used?	DOE	OAK NV* WVDP* CEMP OR	
	OWN	MEMP RF* SRS ER* AEMP	FEMP*
	BOTH		INEEL* AL* SRS TP*
	OTHER	ORP	

*Indicates that site has approved risk policy and procedures as indicated in Question I-1.

- Has appropriate latitude and flexibility been provided for implementation?
- What is the priority, in time and effort, for correcting the weaknesses identified in this survey?

4.2 Training

4.2.1 Observations

Questions and answers from Part III of the survey relating to training are as follows:

Part III - Future Recommended Actions Questions - Training		Yes	No
4	Are the current DOE project management and risk management courses sufficient for your needs?	11	3
5	Would you like more training concentrating on the RCRA and CERCLA aspects of risk management?	5	8
6	Which of the following areas would you like to have more environmental risk focused training made available?		
	Earned Value		1
	Monte Carlo Analysis		2
	Contingency Determination (Cost and Schedule)		4
	Contingency Management		3
	Critical Decision Approval		3
	Configuration Management		0
	ESAAB Policies/Procedures		3
	Baselining		1
	Baseline Change Control		1
	Risk Identification		4
	Risk Impact Determination		5
	Risk Handling		3
	Drafting a Risk Management Plan		2
	Risk Reporting, Tracking, Closure		2
	Schedule and Critical Path Assessment		2
		On-Site	Off-Site
7	What type of training would you like to have more of?		
	Formal Coursework	2	2
	Workshops	6	4
	Seminars	1	2
		Yes	No
10	Would you favor EM-6 workshops with other site representatives to discuss site-specific contractual requirements affecting contingency?	9	5

4.2.2 Assessments

The responses to Question III-4 indicate that, in general, the vast majority of respondents (11 of 14) feel that EM project management and risk management courses are sufficient for their needs. On the surface, this finding would indicate that the available training is adequate but that the implementation in the field may need to be strengthened at selected sites and in selected areas.

Actually, the answers to questions elsewhere in this report indicate that training weaknesses may be more extensive than the sites perceive, and that workshops and/or other types of training could be beneficial. These recommendations are tabulated in Section 5.0, Summary of Recommended Follow-up Actions.

In response to Question III-5 one-third of the respondents indicate that more RCRA and CERCLA training could be beneficial.

Question III-6 provided the sites with an opportunity to indicate areas where they would like to have more environmental risk-focused training made available. Fifteen areas were presented as indicated in Section 4.2.1. Only one area, “Risk Impact Determination,” received more than 30 percent “yes” answers. This is less than the percentage of sites that presented weaknesses in many of the areas of analysis in Sections 2.0 and 3.0.

An analysis was performed to determine if there was a correlation between the aggressiveness of risk management programs at the sites and the perceived need for training.

Figure 4-3 displays 13 responding sites (one site did not respond to Question II-29) as a function of two parameters:

- 1) Answer “yes” or “no” to Question III-4: Are the current DOE project management and risk management courses sufficient for your needs? and
- 2) Answer “yes” or “no” to Question II-29: Does your organization apply contingency to schedule?

Also indicated with an asterisk are the sites that have approved risk policies and procedures as indicated in Question I-1.

Figure 4-3 indicates that:

- 1) Only three of the sites consider that current DOE project management courses are not sufficient for their needs. All three of these sites have approved risk policies and procedures. Two of these three sites apply contingency to schedule.
- 2) All of the sites that do not have approved risk policies and procedures consider current DOE project management courses sufficient for their needs.

- 3) Five of the 10 sites that consider current DOE project management courses sufficient for their needs, do not apply contingency to schedule.

Granting the small sample size, there is still a clear indication that the more serious the attempt to implement effective and approved site risk management policies and procedures, the more is the perception that DOE project management and risk management courses are not sufficient for the need.

An early follow-up by EM with the three site respondents that indicate DOE project management and risk management courses are not sufficient for their needs could be beneficial to identify potential early improvements. This follow-up with the field could also provide early field participation in the process of strengthening DOE project management and risk management training courses.

The responses to Question III-7, when coupled with responses to Question III-10 indicate support for workshop-based training, both on- and off-site. Response to Question III-10 indicates a particular support for discussions related to specific contractual requirements affecting contingency.

This support for workshops likely stems from experience related biases for discussions with peers with similar problems, as opposed to acquisition of more theoretical general knowledge. Whatever the cause, this support could provide the basis for a timely EM training initiative using workshops. Such an initiative could strengthen the sites that at least feel they could use more training through the use of DOE resources that may be stronger in some areas of interest or concern. It could have an additional benefit for those sites that feel they are not in need of additional training or learning.

Figure 4-3

Question II-4. Are the current DOE project management and risk management courses sufficient for your needs?		
Question II-29. Does your organization apply contingency to schedules?	YES	NO
	<p>OAK ORP NV* MEMP WVDP*</p>	<p>INEEL* SRS TP*</p>
NO	<p>AEMP RF* SRS ER* CEMP AL*</p>	<p>FEMP*</p>

*Indicates that site has approved risk policy and procedures as indicated in Question I-1.
 **OR did not respond to Question II-29.

4.2.3 Recommendations

EM should follow-up with the respondents who identified insufficiencies in available project management and risk management training courses to determine:

- Whether there truly are insufficiencies in availability of training courses; or
- How to make the available training courses more visible and useful.

EM should make more RCRA and CERCLA training available.

All training should be of a ‘workshop’ type according to respondents.

4.3 EM-6 Independent Project Reviews

4.3.1 Observations

The following table contains the only question in Part III of the survey relating to EM-6 Independent Project Reviews.

Part III - Future Recommended Actions Questions - Reviews		Yes	No
8	Would you favor project risk focused EM-6 reviews?	3	10

4.3.2 Assessments

In response to Question III-8, 10 of 13 of the respondents indicate they would not favor project risk focused EM-6 Independent Project Reviews. It is not clear why this may be so, but it might be inferred that there is general resistance to any independent reviews at the sites.

4.3.3 Recommendations

EM-6 should determine the level of risk focus appropriate for their reviews, establish that level in the policy, guidance and training, and conduct reviews that provide assurance that the appropriate level of risk focus occurs in the field.

4.4 Risk Reporting

4.4.1 Observations

The following table contains the only question in Part III of the survey relating to risk reporting.

Part III - Future Recommended Actions Questions - Risk Reporting		Yes	No
9	Should additional risk data be in the IPABS-IS (Integrated Planning, Accountability, and Budgeting System–Information System)?	5	9

4.4.2 Assessments

In response to Question III-9, only 36 percent of the respondents indicated that they believe there should be additional risk data in the IPABS-IS.

4.4.3 Recommendations

EM should explore how they can include site assistance to determine the appropriate amount of risk data in the IPABS-IS and how to improve the benefits of site application of the data.

4.5 Issues and Discrepancies in Reported Data

Analysis of some of the inconsistencies and discrepancies noted in the report provides additional insight into areas of weakness in risk management of EM programs. These analyses and consolidated view of some of the reported weaknesses highlight the importance of additional training emphasis in the EM risk management efforts.

Cross-reference of some of the field responses indicate significant inconsistencies and discrepancies in the data reported. For example:

- More respondents indicate that experience/ benchmarking/ lessons learned/ scope changes are reflected in risk assessment plan updates than indicate approved Risk Management Plans.
- Twice as many sites indicate use of a model to assess changes in project assumptions as indicate that they have such a model.
- Fifty percent more respondents indicate use of scheduled impact analysis as a risk management tool than indicate including risk for meeting milestones in the schedule.
- Sites indicating that all contingency analyses and assumptions are documented and justifications are always documented when guide ranges for contingency are not followed are 33 percent more numerous than those sites that have written contingency analyses and estimate procedures.
- Half of the sites that indicate use of probabilistic techniques to estimate contingency do not have an identifiable package of computer software to estimate contingency.
- Only half of the sites indicating application of contingency to schedule have contingency analysis procedures to be applied to project schedules.
- Nearly twice as many respondents indicate application of contingency to durations, cost, or other schedule consideration as indicate the application of contingency to schedule.

Cross-reference of some of the field responses also identifies a significant issue related to applying and improving EM site-wide risk management policies and procedures.

As noted earlier, half of the responding sites do not conduct or offer any project risk management training. Many of the risk management areas that have indicated weaknesses can be directly or indirectly related to training needs. For example:

- Less than half of the sites have approved project risk policies and procedures.
 - ▶ Only one site periodically updates the Risk Management Plan.
 - ▶ Less than half of the sites have an approved project Risk Management Plan.

- ▶ Half of the sites do not have a system for tracking and closing project risks.
- ▶ Only half of the sites consider project risk at CD-0 as required by DOE guidance.
- ▶ Just over half of the sites prepare schedules so that contingency is included.
- ▶ Just over half of the sites include project risk for meeting milestones in the schedule.
- Eleven of 14 sites consider current DOE project management and risk management courses are sufficient for their needs.
- Half of the sites do not conduct training in risk management.

The above findings highlight a significant issue.

If current DOE project management and risk management courses are sufficient for site needs, how are the sites going to use these sufficient training opportunities to train the site personnel and develop approved project risk policies and procedures?

The overall training approach across the EM sites should be consistent at some level, guided by EM policy with implementation emphasis at various sites based on individual site needs.

5.0 SUMMARY OF RECOMMENDED FOLLOW-UP ACTIONS

The recommendations developed by the survey team are presented in this section in a complete and integrated set. A hierarchical presentation has been established in order of the following considerations: policy, compliance with policy and guidance, training, and the adequacy of technical underpinnings.

Analysis of the 86 individual survey questions resulted in 19 identifiable recommendations for EM and three additional recommendations that could also apply to DOE. These 19 recommendations are still a significant follow-up requirement.

Clearly, if these recommendations are to be useful, some organizing principle or principles are required to assist in establishing priorities and time lines.

Hierarchical considerations, i.e., policy, compliance with policy and guidance, training and the adequacy of technical underpinnings, do not provide a very useful indication of priority, especially with regard to establishing priority in time. Therefore, this summary of recommended follow-up actions has incorporated an additional level of consolidation and integration of the report's recommendations to define more clearly a path forward. This recommended path forward has been summarized here following the specific report recommendations and is presented as the summary recommendations in the Executive Summary.

5.1 DOE Complex-Wide Actions (All Program Areas and Sites)

1. DOE and EM should issue necessary policy guidance to: (a) require contingency to be included in all budget requests and/or baselines; and (b) require contingency estimates to be included in budget requests and/or baselines. The policy directive should require site implementation of contingency analysis and estimate procedures appropriate to the projects at the site. These procedures should include development of responsibility, accountability, and allocation between DOE and the M&O contractor.
2. DOE and EM should issue necessary policy guidance and follow-up with workshops, as needed, to require projects to address the management of procurement risks, such as long-lead procurement, GFE, and new vendors, in their risk assessments.
3. DOE and EM should establish a standard probability overrun percentage as a basis for contingency determination. Other probabilities above and below this standard should also be established for sensitivity runs to allow targeting specific project requirements, and determining a managerially accepted baseline contingency.

5.2 EM Recommended Actions

1. EM should strengthen their capability to measure and assure that the sites implement, in a formal way, the policies and guidance that DOE has provided related to project risk management.
2. Using the results of this survey and its initial analysis, EM should charter an appropriate group of Headquarters, field, and support personnel to provide an early evaluation and recommendations that address the following questions:
 - Is the intent of DOE's policy and guidance clear?
 - Has appropriate latitude and flexibility been provided for implementation?
 - What is the priority, in time and effort, for correcting the weaknesses identified in this survey?
3. EM should issue necessary policy guidance and follow-up with workshops, as needed, to require EM projects to include regulatory, state/local government, and stakeholder considerations in their risk assessments.
4. EM should issue necessary policy guidance and follow-up with workshops, as needed, to require EM projects to include management of schedule risks, including contingency, in their risk assessments. Such guidance should require a Contingency Management Plan, using a graded approach, that includes use of analysis and application procedures for applying contingency to project schedules.
5. EM should issue necessary policy guidance and follow-up with workshops, as needed, to require EM projects to include management of budget/financial risks, such as changes in funding profile, in their risk assessments.
6. EM should develop incentives and requirements for the sites to (a) maximize the use of competitive fixed-price contracts, and (b) define the appropriate contingency if fixed-price contracting cannot be obtained.
7. EM-6 should determine the level of risk focus appropriate for their Independent Project Reviews, establish that level in the policy, guidance and training, and conduct reviews that provide assurance that the appropriate level of risk focus occurs in the field.
8. EM should explore how they can include site assistance to determine the appropriate amount of risk data in the IPABS-IS and how to improve the benefits of site application of the data.
9. EM should follow-up with the two respondents who identified a need for additional guidance from both DOE and EM to ascertain what additional policy guidance would be useful.
10. EM should establish a top-level focus on the basic objective, which is, "Understanding that project risk is important to control contingency and other project costs and schedule." Using

the results of this survey and its initial analysis, EM should charter an appropriate group of Headquarters, field, and support personnel to provide an early evaluation, and recommendations with continuing emphasis on achieving this objective.

11. EM should emphasize the use of workshop-type training according to respondents.
12. EM should consider developing and publishing acceptable contingency ranges based on experience.
13. EM should consider early use of workshops to bring the sites to a consistent level of performance with regard to how contingency is being allocated and used at the sites.
14. EM should develop a methodology workshop designed to increase understanding of the available technology and how it could be used in a graded and/or focused approach to strengthen the management of contingency at the EM sites.
15. EM should make more RCRA and CERCLA training available.
16. EM should follow-up with the respondents who identified insufficiencies in available project management and risk management training courses to determine (a) whether there truly are insufficiencies in availability of training courses, or (b) how to make the available training courses more visible and useful.
17. EM should target management attention and/or training to strengthen management of contingency costs at specific sites showing weaknesses.
18. EM should target management attention and/or training to strengthen the management of technical risk at specific sites showing weakness in this area.
19. EM should assure that use of appropriate tools and methodologies are included in workshops focused on policy implementation or training. Of special note is the need for improved management attention for the areas of reporting and tracking methodology and awareness.

5.3 Recommended Path Forward

This path forward is based on the premise that sites will be receptive to risk management improvements, workshops, etc., if DOE policy and management reviews/approvals (e.g., ESAAB) require strict adherence to sound risk management practices as part of the critical decision and project review processes. Therefore, EM should:

- Develop a process to provide visibility and control of activities relating to risk, including policy interpretation, compliance and guidance, training, and project-specific methodology. The breadth and complexity of the activities identified in the survey will require an EM plan for accomplishing them.

- Issue, clarify or reinforce EM guidance that would require sites to implement, in a formal way, the policies and guidance that DOE has provided related to project risk management. The survey analysis indicates that there is a strong correlation between the perceived need and seriousness of application of risk management methodology at those sites that have approved risk management policies and procedures.
- Use multi-site workshops in lieu of “formal training” to clearly communicate a consistent message relative to DOE risk management policy, requirements and guidance. The survey indicates this is the preferred approach for the sites. Workshops will be organized to optimize regional/site participation or common cleanup methods as appropriate. EM will use such tools as the Draft Project Management Manuals, standard risk software (Crystal Ball, Primavera®, etc.), the DOE Risk Center of Excellence, where appropriate, and site-specific data and project cases to make the workshops practical and meaningful. The workshops will focus on identification of risks, risk handling and mitigation strategies, inclusion of results in the baselines, risk management plans, tracking and managing risks, available contingency determination software, and contingency management practices. (Note: This could be accomplished on a larger DOE-wide scale, rather than for EM-only sites or projects.)
- Develop and conduct EM site-specific risk management workshops, preferably focused on specific projects, that will address the following in a “how to” and “hands-on” fashion:
 1. Identification of risks and uncertainties;
 2. Assignment of ownership and management responsibilities for identified risk;
 3. Development of risk handling and mitigation strategies and approaches;
 4. Refinement of baselines to include planned risk mitigation activities (cost and schedule);
 5. Development of risk management plans;
 6. Contracting and acquisition strategies and techniques for mitigating or assigning risks;
 7. Tools and methods for tracking and managing risks, including periodic reassessment and updating of risk databases;
 8. Cost and schedule risk analysis tools and techniques, including contingency estimation and budgeting; and
 9. Contingency management practices and procedures.
- Develop and issue additional policies and guidance as their need becomes clearly identified and articulated.